
GENERAL BUSINESS

This section addresses business issues in two general categories: small and medium-sized enterprises (SMEs) and global corporations. Following these general categories, the specific industries of food and chemical manufacturing are addressed. Both of these specific industries have an obvious importance to the public's health, welfare, and well-being.

SMALL AND MEDIUM-SIZED ENTERPRISES

Background and Vulnerabilities

The Y2K preparations made by small- and medium-sized businesses (SMEs) continue to lag. These entities generally do not have the resources available to devote large efforts towards addressing Y2K. However, when small businesses are compared with medium-sized ones, small businesses are generally in a better position to deal with problems they may encounter from Y2K, while medium-sized businesses are more likely to find themselves in difficulty.

Small firms make two indispensable contributions to the American economy:¹

First, they are an integral part of the renewal process that pervades and defines market economies. New and small firms play a crucial role in experimentation and innovation, which leads to technological change and productivity growth. In short, small firms are about change and competition because they change market structure. The U.S. economy is a dynamic organization always in the process of becoming, rather than an established one that has arrived.

Second, small firms are the essential mechanism by which millions enter the economic and social mainstream of American society. Small business is the vehicle by which millions access the

American dream by creating opportunities for women, minorities and immigrants.

The Small Business Administration (SBA) defines SMEs as those businesses with fewer than 500 employees. In 1995, there were

4,665,040 SMEs according to SBA statistics.² Between 1992 and 1996, 11.18 million new jobs were created. All of the net new jobs came from firms with fewer than 500 employees. Large firms with more than 500 employees posted a net loss of about 643,000 jobs.³ SMEs employ 53% of the nation's private work

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--SENATOR BENNETT

force, contribute 47% of all sales in the country, and are responsible for 51% of the private gross domestic product.

It becomes abundantly clear that SMEs' Y2K preparedness, as well as their business continuity and contingency planning efforts, are extremely important and cannot be overlooked. SMEs play a key role as links in the supply chains upon which big business depends. In economies that run on such tight and long supply chains, the weakening of one or more links weakens the whole chain.

American business has developed and adopted just-in-time inventory as the standard. Lean manufacturing is central to the success of most large, complex factory operations. Precision farming has led to increased production with fewer resources. The supply chain from raw material/basic ingredient production/provider, to preliminary processing, to manufacturer, to distributor, to wholesaler or retailer, and ultimately to final customer, has become ever tighter. The ripple effect from a problem at any point in this chain can be felt throughout the length of the chain.

Due to the interdependency of businesses, prudent businesses are placing a strong emphasis on their Y2K exposure through business partners and supply chains. As supplier and partner assessments of the risks they bring are completed, a flight to quality is emerging.

A large number of small business failures are attributable to management deficiencies. The Y2K problem may highlight this research finding. Despite news stories, speeches, conferences, hearings, and the like, available evidence indicates that millions of small businesses in the United States are ill prepared for the anticipated Y2K problems.

**"SMALL BUSINESSES
ARE THE ENGINES
OF OUR ECONOMIC
GROWTH."**

--SENATOR DODD

Some industries are composed of predominantly small companies, and the consequence of an accident can be disastrous. One such industry is the chemical industry. This industry has a large number of SMEs that often manufacture and handle "designer" or "specialty" chemicals. Due to the risk within this industry, and the fact that there are many thousands of SMEs involved, special attention must be paid to this industry and its Y2K efforts. More details are provided on the chemical industry later in this section of the report.

What is Being Done?

In efforts to move SMEs to action and to provide assistance, the federal government has developed outreach programs by the SBA, the U.S. Department of Agriculture (USDA), and the Manufacturing Extension Partnership of the National Institute of Standards and Technology in the Department of Commerce (DOC). These outreach efforts have included the development of a small business Y2K Help Center hotline for Small Business (1-800-Y2K-7557) and a Y2K Jump Start Kit

(<http://y2khelp.nist.gov/tool.nsf>).

The Y2K Help Center for Small Business has hours between 8:00 a.m. and 8:00 p.m. Eastern Time, Monday through Friday. It provides free help in the areas of Y2K Self Help-Tool (the tool is included in the JumpStart kit) technical assistance and sources of Y2K Compliance information. In addition to its toll free number, the center can be reached by email at y2khelp@nist.gov. An analyst will respond with a follow-up call within one business day.⁴

The "Conversion 2000: Y2K JumpStart Kit" contains everything one need to jumpstart a Year 2000 project. Three different versions of the kit are available for downloading: a Microsoft Access version for users with Microsoft Access 97; a Microsoft Access version for users of Windows 95 or Windows 98 without Microsoft Access; and a Microsoft Excel version for users with Microsoft Excel.

The President's Y2K Council provides outreach through the Small Business, International Trade, and Food Supply Working Groups (FSWG). Details regarding the efforts of the FSWG can be found later in this section. In addition to the SBA's outreach efforts, the agency is in the process of finalizing a Contingency Planning Guide that leverages the excellent products of the Pennsylvania Y2K office.

The President's Y2K Council sponsored its second National Small Business Action Week during the week of March 29–April 2. Every SBA district office committed to at

least one outreach event. In addition, the USDA and the DOC joined the SBA to help organize and train core Y2K teams for each state. The main purpose of these events was to help business owners assess how their businesses might be impacted by Y2K problems and to develop strategies for remediation, testing, and contingency planning.

Congress passed the Y2K Act, which is intended to encourage Y2K remediation instead of Y2K litigation by providing modest limitations on Y2K liability. It was signed into law on July 20, 1999 (Public Law Number 106-37). Among other things, the Act provides for a cap on punitive damages for individuals and small businesses (50 employees or fewer). The cap is the lesser of three times compensatory damages or \$250,000, and the cap does not apply if the defendant acted with specific intent to injure the plaintiff. More details about the Act are contained in the Litigation section of this report.

More directly targeted at SMEs is the Small Business Year 2000 Readiness Act, which authorizes the SBA to provide Y2K loan guarantees that address two issues: 1) funds needed to purchase the systems, software, and services they need to become Y2K compliant, and 2) funds to assist small businesses that suffer economic injury as a result of the Y2K problem. This Act was signed into law on April 2, 1999 (Public Law Number 106-8). Further details are discussed in the Legislative Activities appendix of this report.

At the Committee's request, the

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Chemical Safety and Hazard Board issued a report on Y2K and the chemical industry in March 1999. In May, the Committee held a field hearing in New Jersey on the issue. In view of continuing concerns, on August 6 the Committee sent the President's Y2K Council a letter strongly recommending the convention of a Chemical Sector Summit. The Council held a Chemical Roundtable during September 1999 to address Y2K issues.

A list of very informative related Y2K WWW sites is provided as an appendix to this report, Appendix IV. Each site has a short description of its primary focus.

Status

Industry associations with large company membership almost uniformly assert that their members will be ready. They indicate that the majority of their members are now in the process of developing business continuity and contingency plans as well as addressing supply chain and business partner risks.

A March 1999 National Association of Manufacturers (NAM) Small Manufacturers Operating Survey, which had more than 1,700 responses, found that more than 55% had completed preparing their in-house accounting systems, design and control functions, and shop systems; 52% of small manufacturers were in the process of develop-

ing contingency plans; 40% did not think there is a need for a contingency plan; 83% do not plan on stocking additional inventory prior to December 31 in preparation for possible disruptions; and 77% are communicating their Y2K readiness to vendors, suppliers, and the public.

One of the best barometers of small business activity aimed at meeting the Y2K challenge is the National Federation of Independent Businesses (NFIB)/Wells Fargo Bank study. Its basis is data collected from a national small business sample. The most recent, third report looked at data collected between mid-April and mid-May of 1999. That time interval is almost exactly one year after data collection for the first report, and six months after data collection for the second. As a result, it is possible to track the evolution of small business preparedness for Y2K over the last year.⁵

Small business Y2K preparations are a dynamic process; the figures presented in these reports are constantly changing. Fortunately, the dynamic appears consistent over time, so reasonable projections from the data can accurately portray the current condition of small business owner preparation for Y2K.

The chart in Figure 1 shows the steady change in Y2K awareness by those small employers with direct exposure. The number of employers in the study with direct exposure has not changed, as expected. As the

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chart shows, an estimated 95% of all small employers are somewhat or very aware of Y2K. When those with direct exposure are the focus, the percentage rises to 97%; however,

of those plan not to take any action. Although awareness appears to be at a high level, 97%, awareness outreach efforts are still needed and should focus on three areas:

	<u>April 1998</u>		<u>October 1998</u>		<u>April 1999</u>	
	Sm. Empl.	Sm. Empl.	Sm. Empl.	Sm. Empl.	Sm. Empl.	Sm. Empl.
AWARE-	All Small	Directly	All Small	Directly	All Small	Directly
<u>NESS</u>	<u>Employers</u>	<u>Exposed</u>	<u>Employers</u>	<u>Exposed</u>	<u>Employers</u>	<u>Exposed</u>
Very	53%	59%	55%	61%	70%	75%
Somewhat	28	28	34	33	25	22
Not Very	9	6	6	4	4	2
Not at All	10	7	5	1	1	1
N/A	*	*	*	1	*	*

Figure 1: Y2K Awareness by Direct Small Employer Exposure to Y2K Over Time

the percentage that is very aware rose to 5%. Therefore, awareness within the small business community does not appear to explain why it is still lagging in Y2K efforts.

According to the third NFIB/Wells Fargo survey and report, at least 18% of all small employers directly exposed to the problem will not be prepared for Y2K if trends continue. Of those that have fixed their Y2K problems, more than two-thirds of the respondents incurred costs less than \$5,000. Six percent of those surveyed reported having already experienced one or more Y2K-related malfunctions in 1999. Five out of six small businesses have some direct Y2K exposure, and 28%

1. many do not believe Y2K is a problem that must be addressed;
2. many do not know how to detect and resolve potential problems; and
3. many believe that costs are significant, or at least greater than the benefits.

The author of the report notes that, "suspicion rather than resources seemed to be the primary generic motivation for inaction."⁶ The chart in Figure 2 shows the Y2K readiness of directly-exposed employers.

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<u>April 1998</u>			<u>October 1998</u>		<u>April 1999</u>	
		Sm. Empl.		Sm. Empl.		Sm. Empl.
PREPAR-	All Small	Directly	All Small	Directly	All Small	Directly
<u>EDNESS</u>	<u>Employers</u>	<u>Exposed</u>	<u>Employers</u>	<u>Exposed</u>	<u>Employers</u>	<u>Exposed</u>
Action						
Taken	19%	23%	34%	40%	51%	59%
Action						
Planned	22	27	17	19	11	12
No Action	56	46	46	38	36	28
N/A	3	4	3	3	2	1

Figure 2: Y2K Preparedness Status of Directly Exposed Small Employers Over Time

This lack of Y2K preparedness is not just an American problem. On a broader scale, it is found universally in developed countries. For example, a study released on September 6, 1999, by Novell revealed that 26% of Europe's small businesses are not ready for Y2K! Information technology managers at 1,035 companies, each with between 10 and 99 employees, in eight countries participated in a June telephone information survey that supported the study. More than 70% of respondents believed the Y2K problem would simply result in minor disruptions. Countries with small businesses lagging furthest behind are France, Poland, and Norway.⁷

Expectations

Largely domestic businesses will be okay, while small and medium-sized companies will see some in their ranks experience business failures.

Due to the interconnectedness of today's businesses, it is very likely that the failure of SMEs will have a ripple effect through the supply chain that will affect their bigger business partners. Those with critical international partnerships and suppliers are more likely to have disruptions caused by those relationships.

In addition to consumer purchases of additional household items in preparation for Y2K, businesses, as part of their business continuity and contingency plans, will acquire additional supplies. The markets will probably have difficulty meeting this increased demand, particularly if it all occurs during the last couple months of 1999. Furthermore, vacant storage facilities will become a scarce commodity.

As businesses have moved to just-in-time inventory and lean manufacturing processes, they have benefited from the reduced storage re-

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quirement. The result of this stocking up at the end of the year will lead to an oversupply in inventories in the first quarter of next year that will likely slow the economy.

A June study in the United Kingdom found that 60% of the business respondents admitted they were already stockpiling due to their fears of disruptions.

There is still time for SMEs to take action, but the majority of these firms that have decided not to take action will probably not change their position.

Special attention must be paid to the chemical industry, especially the small- and medium-sized companies. Coordination of contingency plans with local emergency response organizations and surrounding communities is key.

Concerns

- Despite the SBA's efforts and some \$10 million dollars spent, Y2K testing weaknesses increase the risk that SBA's mission-critical systems are not yet Y2K ready. Key business processes were not specifically tested. Systems acceptance tests are incomplete. There has been no independent validation of SBA mission-critical systems' testing and these systems have not been certified as being Y2K ready. Finally, its approach to end-to-end testing is inadequate. This leads to the concern that the SBA lacks reasonable assurance that its systems will function correctly

and adequately support its key business areas and functions in 2000 and beyond for more than 490,000 small businesses nationally that use its services.⁸

- The Committee is also concerned that SMEs taking the wait-and-see approach may end up being the weak link in a supply chain if it experiences Y2K problems. High consequence industries must continue to bring resources to bear to identify these risks and take appropriate action to further mitigate them.

GLOBAL CORPORATIONS

Background and Vulnerabilities

Although large, global corporations and businesses are generally well prepared domestically, market and legal pressures continue to drive their Y2K decisions. They appear to be well into the business continuity and contingency planning process. Risks and vulnerabilities still lie in the interconnectedness and interdependency of business and industry just-in-time inventories and lean-manufacturing processes. Dr. Ed Yardeni, chief economist at Deutsche Morgan Grenfell, noted "The biggest companies, while most prepared, are also the most vulnerable to the weaker links in the global supply chain."⁹ In response to this vulnerability, global corporations are spending significant resources and taking prudent actions to address supply chain and business partner

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Y2K risk.

It is the Committee's understanding that many global corporations have already had to make or are making difficult supply chain and business partner decisions. Most often these decisions are made as business continuity and contingency planning efforts move forward. An August 1999 survey found that among major corporations 36% are "very likely" to stop doing business with product and service suppliers assessed as non-Y2K compliant. This percentage represented an increase of 41% since May 1999.¹⁰

In the second half of the 20th century, international business—the process of conducting business across national boundaries—has become an important economic force. Today few, if any, countries are economically self-sufficient. Global corporations (also referred to as multinational or transnational corporations) are the principal participants in international business.

Global corporations are for-profit enterprises (public or private) that engage in enough business activities—including sales, distribution, extraction, manufacturing, and research and development—outside the country of origin to make them financially dependent on operations in two or more countries, and whose management decisions are made based on regional or global alternatives.

While still maintaining a domestic identity and a central office in a particular country, global corporations

aim to maximize profits on a worldwide basis. The corporation is so large and extended that it may be outside the control of a single government. Besides subsidiaries, a global corporation may have joint ventures with individual companies, either in its home country or foreign countries.

Global corporations are among the world's biggest economic institutions. A rough estimate suggests that the 300 largest global corporations own or control at least one-quarter of the entire world's productive assets. Global corporations' total annual sales are comparable to or greater than the yearly gross domestic product of most countries. Though based predominantly in Western Europe, North America, and Japan, global corporations' operations span the globe.

Global corporations face many of the same issues as domestic companies. These include maximizing profits, meeting customer demands, and adapting to technological change. In addition, global corporations must stay current with trends and events in the various countries where they operate.

Over the past 25 years, global corporations have proliferated. In 1970, there were some 7,000 parent global corporations, while today that number has jumped to 38,000. Ninety percent are based in the industrialized world and control over 207,000 foreign subsidiaries. Since the early 1990s, these subsidiaries' global sales have surpassed worldwide trade exports as the principal vehicle

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to deliver goods and services to foreign markets.

The large number of global corporations can be somewhat misleading, however, because the wealth of global corporations is concentrated among the top 100 firms (see Figure 3 for the 25 largest US Multinationals). In 1992, those 100 firms had \$3.4 trillion in global assets, of which approximately \$1.3 trillion was held outside their home countries.

What is Being Done?

The Committee continues to hold hearings that are focused on industry sectors and stimulating action. These hearings investigate businesses large and small, global and domestic across all industries. During the 106th Congress, the Committee has held four hearings in under the general businesses sector. Two hearings focused on the food supply sector: one in February and one in March. A field hearing in May focused on the chemical industry. And finally, a July hearing addressed global corporations and the exposure they face due to their supply and business partners particularly those abroad.

The President's Y2K Council continues related outreach efforts through the International Trade and Food Supply Working Groups. The Inter-

national Trade Working Group is lead by the Department of Commerce. At the time of the Special Y2K Committee's July 1999 hearing, Department of Commerce was in the process of conducting an assess-

Rank	Company	Foreign Revenue (\$ million)	Total Revenue (\$ million)
1	Exxon	80,705	100,697
2	IBM	46,364	81,667
3	Ford Motor	43,819	144,416
4	General Motors	40,918	132,863
5	Texaco	31,313	39,497
6	General Electric	31,278	100,469
7	Mobil	28,009	47,678
8	Citigroup	26,276	76,431
9	Hewlett-Packard	25,531	47,061
10	Philip Morris Cos.	19,814	57,813
11	Chevron	19,008	40,216
12	Procter & Gamble	17,928	37,154
13	American International Group	17,478	33,296
14	Compaq Computer	17,188	31,169
15	Intel	14,610	26,273
16	Motorola	13,990	29,398
17	Xerox	12,767	22,854
18	Wal-Mart Stores	12,247	137,634
19	Coca-Cola	11,721	18,813
20	El du Pont de Nemours	11,692	24,767
21	Halliburton	11,221	17,353
22	Johnson & Johnson	11,095	23,657
23	Dow Chemical	11,030	18,441
24	United Technologies	10,307	25,715
25	Caterpillar	10,107	20,977

Figure 3: The 25 largest U.S. multinationals

ment of the economic impact of Y2K on the global economy. The Committee had hoped, fruitlessly, that the assessment would have been completed prior to its publishing this report. The activities of the Food Supply Working Group (FSWG) are discussed in its own subsection below.

As discussed in the small business subsection, legislative activity included the passage of the Y2K Act. Related to this Act is the Year 2000 Information Readiness and Disclosure Act, Public Law No. 105-

271, which was passed late during the last Congress. That Act provided a basic level of protection for Y2K – statements made in good faith.

The CRASH Protection Act of 1997 (S.1518, 105th Congress) pressured the Securities and Exchange Commission (SEC) to require more meaningful Y2K corporate disclosure to shareholders. However, despite the SEC rule requiring Y2K disclosure of public corporations, companies are reluctant to report compliance levels primarily because they fear litigation or ceding a competitive advantage. In August 1999, the SEC fined nine investment entities for failure to adequately disclose Y2K readiness information.

Status

Industry associations with large company membership almost uniformly assess that their members will be ready. They indicate that the majority are now in the process of developing business continuity and contingency plans in addition to addressing the external risk they face from business and supply partners, both foreign and domestic.

Merrill Lynch, in a July 1999 special report, two points that bear mentioning. Firstly, *"Y2K has largely disappeared from the radar screens of most of the U.S. corporations we track."* Secondly, *"many companies, however, have expressed concern about their ability to remain compliant with global counterparts around the world: compliance in the U.S. can be easily compromised by non-compliance in other countries. Funds*

*flow are an especially critical focal point."*¹¹

**"JUST AS Y2K POSES
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DISTRIBUTION AND SUPPLY
CHAINS THAT CROSS
INTERNATIONAL BORDERS."**

--SENATOR BENNETT

Great preparatory strides have been made throughout many U.S. industry sectors over the last nine months. Nonetheless, these strides have not carried any organizations, companies, or corporations far enough that complacency can be allowed to set in. Much work remains, particularly in the area of addressing external risks and contingencies. There are far too many uncertainties and complex interdependencies that exist keeping risk looming over everyone.

Gary Beach, CIO Magazine Publisher, with Dr. Ed Yardeni's Y2K Center and the Information Systems Audit and Control Association (ISACA) jointly conducted a Y2K Experts Poll in June 1999. Over half of the 892 poll respondents represented large, U.S.-based corporations. A number of the polls finding were quite revealing. On average these large corporations had 1,300 partners or suppliers interconnected, worldwide. It is clear that examining the risk exposure due to over a

thousand partners/suppliers is no simple task.

More disconcerting is the fact that almost one in ten respondents admitted *"they will not complete their Y2K work until the Year 2000 or beyond."* A full 33% were not meeting their schedule. On average, 3% of large firms' mission-critical systems are expected to fail or malfunction. Thirty-five percent of large firms said they were still waiting for third-party vendors to provide Y2K-compliant versions of mission-critical programs.¹² Yes, several months have passed since the data was collected for this analysis and progress has likely been made in these areas. However, it is clear there is still much work that remains.

Underscoring the findings of the June Y2K Experts Poll, an August CapGemini poll found that 48% of U.S. major corporations expect all of their critical systems to be prepared for the Year 2000. Given the expectation that many critical systems will be fixed after January 1, 2000, business continuity and contingency plans gain additional importance. Large numbers of large, global corporations are establishing Y2K management centers to handle consequence management issues. This same survey indicated that over 95% of respondents plan on setting up such centers.¹³

Expectations

Due to the interconnectedness of today's businesses, it is very likely that the failure of small and medium-sized businesses will have a ripple effect through the supply chain that will affect bigger business partners. Those with critical international partnerships and suppliers are more likely to have disruptions caused by those relationships.

A flood of lawsuits is a real possibility given the litigious nature of our society and the complexities of successfully addressing Y2K.

In addition to consumer purchases of additional household items in preparation for Y2K, businesses, as part of their business continuity and contingency plans, will acquire additional supplies. The markets may have difficulty meeting this

increased demand, particularly if it all occurs during the last couple months of 1999. Again, these preparatory actions could in aggregate cause shortages of some items if they occur in a short period of time.

Furthermore, vacant storage facilities will become a scarce commodity. As businesses have moved to just-in-time inventory and lean manufacturing processes, they have benefited from reduced storage requirements. The result of this stocking-up at the

"... should a large number of companies want to hold even a few extra days of inventories, the necessary, albeit temporary, increase in production (or imports) to accommodate such a stock building could be quite large. Bottlenecks could develop, and market pressure could ensue."

--ALAN GREENSPAN, FEDERAL RESERVE CHAIRMAN

end of the year will lead to an over-supply in inventories in the first quarter of next year that will slow the economy.

Significant progress has been made by businesses; some experts who had previously predicted an economic recession have reassessed the Y2K landscape. Now, they forecast an economic slowdown. For example, Merrill Lynch concludes that their survey data indicates that, *"based on factual evidence, the risk of serious economic dislocation from Y2K non-compliance is diminishing."* The data shows that on average the GDP impact could be as great as 0.25% each quarter.¹⁴

Concerns

"There is significant potential for cascading failures in global corporations which have interdependent parts that span multiple borders."

--SENATOR DODD

- Although the presence global corporations have in foreign countries have caused them to make outreach efforts to high risk countries as they watch out for their own self-interest, some foreign countries that are vitally important to global corporations are likely to have critical-failures. The Committee is concerned about how those failures will manifest themselves within U.S. global corporations, the world economy, the U.S. economy, and ultimately impact the consumer.
 - The Committee is concerned about temporary fixes to Y2K problems that have been made to 'survive' the actual date transition and system specific date horizons. Many large corporations, as well as numerous federal agencies, performed a triage process to identify their mission-critical systems. Subsequently, they identified the type of solution that they would use to solve any Y2K problems identified in mission-critical systems.
- Those solutions ranged from permanent solutions, using date expansion, to temporary ones, using some type of sliding or fixed windowing. Those that performed temporary fixes must have a process for tracking the time at which the fix will no longer work. Many are hoping that the systems will be replaced prior to that time and/or they will retire before that time and it will be someone else's problem. To some extent, this is how Y2K got to be such a major problem in the first place.
- Another output of a triage approach to Y2K is a list of non-mission critical systems. Companies and organizations are finding that systems they had believed to be non-mission critical actually interfaced with a critical system. After assessing the interdependency of the two systems, often they have found the system originally classified as non-mission

critical actually was critical by virtue of its interconnection. The Committee is concerned about the possible number of mission-critical systems that were incorrectly identified as non-mission critical and have yet to be remediated, tested, and implemented.

- The issue of bad actors having breached security during Y2K remediation is of growing Committee concern. The Gartner Group predicts that Year 2000 remediation activities will cause security lapses that allow at least one publicly reported electronic theft by 2004 in excess of \$1 billion.¹⁵ The issue of information assurance and computer security is a growth area for the next millennium.
- Corporate Y2K disclosures are less forthcoming than they should be. Corporations have expressed numerous reasons for not providing full disclosure. Some claim that it is a competitive advantage issue. Others, that Y2K is material to the business and thus does not require detailed reporting. Still others express concern over legal liabilities. The list goes on.
- Most global corporations are heavily engaged in continuity of operation and contingency planning activities as they further their Y2K preparations. The Committee is increasingly concerned with the lack of coordination of these contingency plans externally with other stakeholders within industries. Furthermore, if there may be a need for emergency re-

sponders that may have to react in the event the need arises for contingency implementation, they must be familiar with contingency plans and their key assumptions. This lack of coordination could result in sufficiently large numbers of organizations or companies planning on a particular alternative support/supply source such that the source could never meet the demand if it was called upon.

- During the Committee's July 22, hearing on global Corporations, the Department of State Inspector General highlighted a Committee concern. She noted that in 1998, the U.S. accounted for almost 13% of over \$5 trillion in total world trade. Addressing the possible impact of Y2K on world trade, she said, "*our assessments suggest that the global community is likely to experience varying degrees of Y2K-related failures in every sector, in every region, and at every economic level.*"¹⁶ Coordinated, realistic, tested, contingency and continuity of operations plans are key to ameliorating the situation.

THE FOOD INDUSTRY

Background and Vulnerabilities

The U.S. manages to feed not only its own population of 260 million people, but also to export \$70 billion of food products each year to people around the world. Food shortages--even the threat of shortages--are

uncommon here at home. Neighborhood grocery stores are taken for granted and are expected to have shelves stocked with food products that are safe and affordable. In addition, high quality and a variety of brands are the norm.

The food supply industry, which comprises 16% of our nation's economy, is large, complex, and interdependent. Within the U.S., the industry has integrated modern information technology into processes that increase productivity, yield, and profitability.

A survey earlier this year highlighted the fact that more than 80% of American farmers use computers as an integral part of their business; a third of those are connected to the Internet, and almost 75% own a cellular telephone. In the early 1990s, farmers began to use the GPS, leveraging the capability to pinpoint location information about specific field areas. This accurate location data eliminates the guesswork in determining yield variances, crop damage, and soil fertility.

These innovations, along with advances in seed, fertilizer, pesticide, and herbicide, have made American farmers the most productive in the world. A century ago, the average U.S. farm output fed eight people. Today, it feeds 212.

Ranchers, processors, manufacturers, distributors, and local retailers have made similar advances that have led to their dependence on high technology. For example, farmers and ranchers use electronic irrigation

systems, animal feed systems, and transport systems. Processors rely on automated systems that help prepare and package consumer-ready products. Distributors, wholesalers, and retailers depend on computer-driven equipment and inventory and accounting systems to transport, deliver, store, display, and sell food products. They also rely on equipment with time-dependent embedded computer chips, such as harvesting equipment; grain elevators; plant, warehouse and truck refrigeration systems; store and plant security systems; and heating, ventilation and air conditioning systems. Each is important to the food supply chain. Possible Y2K disruptions in one can ripple through the chain, affecting all.

Like other industries, the food industry is critically dependent on the transportation and utilities industries, and their Y2K preparedness will directly impact the food supply.

What is Being Done?

The Committee met with significant resistance when it began investigating this vital industry more than a year ago. This resistance has substantially diminished. In early 1999, the Committee held two hearings focused on the food supply chain. Its February 5 hearing addressed the 'farm side' of the 'farm-to-fork' supply chain. Witnesses included Senator Lugar, Chairman of the Senate Agriculture, Nutrition, and Forestry Committee and presently a member of this Committee; the Secretary of Agriculture; and representatives from Cargill, Suiza, and the American

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Farm Bureau Federation.

The March 2 hearing shifted the spotlight toward the "fork side" of the food supply chain. Witnesses included representatives from the Food Marketing Institute (FMI), SUPERVALU Inc., Kroger Company, the Grocery Manufacturers of America (GMA), Kraft Foods, and Nestle USA.

The Food Supply Working Group (FSWG), led by the U.S. Department of Agriculture (USDA), has shed a bright light on the preparedness of the food industry. The FSWG has taken a different approach than that of other working groups under the President's Y2K Council; it has decided not only to depend on industry associations for input into its assessment but has also contracted out for additional assessment work.¹⁷ While there are shortcomings with assessing any industry as complex as that of food, USDA should be

commended for its efforts to provide as complete and accurate picture as possible.

The USDA identified the top four companies in 25 separate industry topic areas across four general categories: processors, farm input (seeds, feed, and so on), wholesalers (to restaurants, institutions, supermarkets, and convenience stores), and retail supermarkets. The USDA analyzed the market share these four corporations, in aggregate, held within each particular industry, represented as a percentage. In the following figures, CR4 equates to Concentration Ratio of the four largest corporations.

Figure 4 shows eight selected industries topics of 19 identified by the USDA within food processing. As the figure shows, infant food, breakfast cereals, and beef have the highest percentage of concentrated market share among the leading four firms.

Industry Topic	First	Second	Third	Fourth	Est. CR4 (%)
Beef	IBP, Inc.	ConAgra	Cargill (Excell)	Farmland National	72
Chicken	Tyson's	Goldkist	Perdue	ConAgra	60
Fluid Milk	Dean Foods	Suisa	Dairy Farmers of America	Land O'Lakes	35
Cheese	Kraft Foods	Leprino	Dairy Farmers of America	Land O'Lakes	60
Bread	Flowers	Continental	Interstate Bakeries	Campbell Soup (Pepperidge)	50
Breakfast Cereals	Kellogg	General Mills	Kraft Foods (Post)	Quaker Oats	85
Infant Food	Gerbers	H.J. Heinz	Beach-Nut	Nestle	95
Fresh Vegetables	Dole	C.H. Robinson	Fresh Del Monte	Tanimura & Antle	45

Figure 4: Leading food-processing firms by industry (source USDA)

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As a result, the preparedness of these four companies has the greatest impact on the preparedness of the industry area as a whole. Fluid milk, fresh vegetables, and bread have the least market share concentrated with the four largest firms. As a result, a larger number of firms must be examined to determine the their health.

Figure 5 addresses the concentration ratio for other categories used by the USDA help assess the overall industry Y2K preparedness.

Other inputs into the FSWG/USDA food supply assessment include a survey commissioned by the FSWG

of small- and medium-sized food producers, processors, wholesalers and retailers; a Year 2000 analysis of international food transportation modes prepared by USDA; and the results of surveys and audits conducted by the major food trade associations since the last FSWG report in March.

Since March, the GMA, FMI, Food Distributors International (FDI), National Retail Federation, National Grocers Association, National Association of Convenience Stores, and others have completed surveys, white papers, educational forums, and other activities to aid their members and the industry in addressing

Industry Topic	First	Second	Third	Fourth	Est. CR4 (%)
Seed	Dupont (Pioneer Hi-Bred Int'l)	Monsanto (DeKalb)	Northrup-King	Dow Chem	60
Fertilizer	IMC	PCS	CF Industries	Farmland	60
Feed	Koch Industries	Cargill	ADM	Continental	40
Leading farm input firms by industry					
Industry Topic	First	Second	Third	Fourth	Est. CR4 (%)
Foodservice wholesalers	Sysco	JP Foodservice	Alliant Foodservice	PYA/Monarch	35
General line Grocery wholesalers	Super Valu Stores	Fleming Companies	Wakefern Food Corp.	Nash Finch Company	50
Leading food foodservice and general grocery wholesaler firms					
Industry Topic	First	Second	Third	Fourth	Est. CR4 (%)
FOOD RETAILING	Kroger/Fred Meyer	Albertson's/American Stores	Safe-way/Dominick's	Ahold USA	30
Leading retail supermarket chains					

Figure 5 (source USDA)

Y2K as well as assessing the industry preparedness. For example, in response to an invitation from the Committee, the overall readiness of the food manufacturing industry was assessed by GMA, in conjunction with EDS. The results were published in a March 1999 pamphlet, "Year 2000 & The Food and Consumer Products Industry" indicating an overall readiness. The reader should refer to the report for details of the snapshot provided by this assessment.

A collaborative effort earlier this year between GMA and FMI resulted in the publication, "Y2K Business Contingency Planning, Y2K Framework." The stated objective of the document is to provide grocery industry trading partners information to help deal with potential Y2K-related supply chain interruptions.

Ernst & Young conducted research interviews along the entire food supply chain as part of the effort supporting this publication. One conclusion agreed upon by research participants was that "achieving stability throughout the supply chain at the close of 1999 and the beginning of 2000 will rest, in part, on business contingency planning between trading partners."¹⁸ As it has previously been stated in this section of the report, it is important that contingency plans are coordinated externally.

Finally, the President's Y2K Council and FSWG hosted a food supply roundtable on May 20, 1999. More than 50 industry representatives from all links in the "farm-to-fork" chain participated. The roundtable's

goal was to gather information on Y2K relative to food delivery and supply. Industry experts at the event noted that the industry, as a matter of course, is used to dealing successfully with emergency situations. Companies are prepared with contingency plans that are being refined for Y2K. Participants resolved to continue to work together and actively support community level efforts to provide detailed local food supply Y2K preparedness information.

Status

As in its March 1999 assessment, the Gartner Group finds the current state of the food supply industry is still "encouraging." However, at this point, as in March, things should look better than encouraging. Nevertheless, it is important to credit the industry overall since much progress has been made during the last several months. Overall, the report concludes that *"it is highly unlikely that no disruptions will occur, but with the current state of preparedness, it is expected they will have light to moderate effect. Most of the interruptions are expected to be very short lived and will be resolved within a few days."*¹⁹

Figure 6 gives a risk assessment of the industry topic areas in Figure 4 and 5 above. For a complete analysis of the original 25 industry topic areas discussed above in the background and vulnerabilities section, refer to the actual report. The status in Figure 6 and subsequent discussion of the Gartner Group's status assessments analyze the current state of the industry with some per-

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spective, since this is its third assessment since December 1998.

The *distribution* column indicates: 0 – no impact; 1 – isolated; 2 – moderate; and 3 – widespread. *Severity* is categorized as 0 – no impact; 1 – minor; 2 – moderate; and 3 – severe. Finally, *probability* ranges from 0.0 – completely impossible; to 0.5 – a toss up; to 1.0 – this has already happened, but either the event has been hidden or the full impact is not yet realized. In the figure, 0.2 indicates this will not happen, barring

Topic Name	Distribution	Severity	Probability
Chicken	1.8	2.17	0.20
Cheese	1.8	1.88	0.24
Retail Supermarket Chains	0.9	1.88	0.24
Infant Food	2.85	1.33	0.28
Beef	2.16	2.06	0.31
Breakfast Cereals	2.55	1.56	0.31
Seed	1.5	1.31	0.31
Bread	1.5	2.25	0.58
Fertilizer	1.8	1.25	0.58
Fluid Milk	1.05	2.25	0.58
Foodservice Wholesalers	1.05	1.75	0.58
Fresh Vegetables	1.35	2.25	0.58
General-Line Grocery Wholesalers	1.5	1.75	0.58
Feed	1.2	1.50	0.58

Figure 6: Industry topic risk assessment (source: Gartner)

exceptional circumstances and 0.3 indicates there is good reason to believe this will not happen, but there is some chance it will.²⁰

One of the most revealing findings in the Gartner Group's current status assessment is that 25% of food supply companies have not addressed supply chain and embedded systems issues. While this number represents an increase of 10% since the March assessment, it is cause for concern and should be a signal to the indus-

try that increased remediation and contingency planning effort is warranted in this area.

A survey commissioned by the FSWG of small- and medium-sized food producers, processors, wholesalers, and retailers of perishable foods yielded results consistent with the NFIB. 1,133 firms responded to the survey and indicated that half of the firms will be conducting remediation efforts until almost December 31. Twenty-seven percent of the mid-sized firms have written contingency plans. While this percentage is significantly higher than the 5% for small companies, it is still very low. As was pointed out in the SME section above, it is believed that the mid-sized firms are at greater risk to Y2K impacts than small firms are. Thus, their need for realistic, tested contingency plans is much greater.

GMA is in the process of completing the analysis of survey data it collected up to June 1. Indications are that survey respondents felt they would complete their Y2K work by September 1. This survey follows a member survey completed in December 1998. The areas covered during this current survey include contingency planning, technical readiness, and testing. Average member companies are spending \$27 million to address Y2K while some global food companies spending exceeds \$100 million.

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Moving to the issue of transportation, USDA's Foreign Agriculture Service (FAS) personnel serving in foreign posts collected information used to assess international agriculture transportation issues related to Y2K during May 1999. They targeted the top 10 countries that are markets for U.S. agriculture exports and the top eight suppliers of imported food products excluding Canada. Key points of the survey include:

- most U.S. export markets are generally in the testing and implementation stages as they relate to food distribution and transportation;
- suppliers of food products to the U.S., mainly Central and South American countries, have already achieved a very high level of Y2K readiness; and
- major ocean carriers appear to be the most compliant of any of the international food transport sectors.²¹

Expectations

The Gartner Group research indicates that Y2K system failures will occur in highest volumes from third quarter 1999 through first quarter 2001, with the highest volume peaks during fourth quarter 1999 and first quarter 2000 through third quarter 2000. Most companies understand this and are including it in their strategy for Y2K projects. Since the world is about to enter the first

quarter of the anticipated peak period, those firms furthest behind must work with a sense of urgency and diligence on key contingency planning activities.

As with business in general, larger corporations are better prepared than SMEs. Studies and research conducted by this Committee, the NFIB, the Gartner Group, CapGemini, and others all appear to agree on this point. The food industry is no exception. Thus, the industry topic areas with higher estimated concentration ratios (CR4) in the figures above are generally going to be more prepared than those with smaller ratio percentages.

Disruptions will occur, however, the industry is likely to be very responsive in resolving them. Given the emphasis given to and resources spent on Y2K, the industry is alert and watchful. As noted, they are an industry that is accustomed to responding to natural disasters and have done well historically in those situations. The question that remains is whether there are Y2K-related disasters of unseen proportions (first order, second order, cascading, and so forth) and well prepared the industry might be for such disasters.

***"THE TOLERANCE OF
THE AMERICAN PUBLIC
FOR SYSTEMATIC
DISRUPTIONS HAS BEEN
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SITUATION WILL BE NO
DIFFERENT."***

--SENATOR LUGAR

Kroger testified at the March Committee hearing that it maintains safety stock inventory levels that are typically about 35 days in distribution centers and stores. However, shelf-life is clearly one determining factor

in the amount of inventory of a product. In response to Senator Dodd's question regarding product contingency planning, FMI's president said *"... for processed products, there are somewhere between three and five weeks of products on hand in retail facilities, and in the pipeline all the way through from the processor to retail, there would be several months of supply on the way already here and available for consumption."*

The FSWG's third quarterly report to the President's Y2K Council noted that most major corporations expect to increase inventory along their supply chains as part of their contingency planning. The weak link in the chain may be the ability to transport this robust inventory to the needed locations for sale.

If Y2K causes significant problems for utilities in rural areas, the farm side of the food supply chain will experience longer outages than if problems occurred in urban areas and cities. This is largely due to the realities of rural living and the fact that resources most often are first applied where the greatest concentration of people is located. Thus, some farmers are preparing for possible disruptions that may last a little longer than a few days.

If the Y2K problem does cause severe disruptions in some countries, the U.S. may be asked to provide humanitarian assistance in the form of food aid.

Concerns

- Some food supply companies are not open and responsive to inquiries in Y2K preparedness at the local level despite their awareness that public perception of their preparedness will ultimately affect the types of personal preparations individuals make. One great area of concern is that panic buying and stockpiling of food might result in a self-fulfilling prophecy resulting in shortages and disruptions. Continued movement by the food industry to the more open stance it has recently taken at the local level will help ameliorate the situation.
- Food banks should plan for the possibility of a surge in donations during the first quarter of 2000 if Y2K impacts are few.
- If buying were to increase to a pace exceeding the current supply, it is important that Americans who need help most and are least able to prepare individually for Y2K are considered as part of local and state contingency and business continuity plans. Non-governmental agencies that support these individuals should be included in these plans.
- As with most of the industry assessments, most of the information base upon which analysis is conducted is founded upon self-reported information. Again, the Committee is concerned that the nature of this information raises the suspicion that it is overly op-

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timistic. Independent validation and verification are critical elements of successful Y2K programs. The Committee commends USDA for expending additional effort to balance the association industry assessments with one which may be more objective.

workers. It is also the largest exporter, accounting for \$69.5 billion or 10% of the total exports in 1997, easily outdistancing the second leading industry—agriculture—and generating a trade surplus on average of more than \$16 billion annually over the last ten years.

The chemical industry has set high standards for safety, and has a very proactive program to preserve this

record and to continuously improve on health, safety, and environmental performance. Nevertheless, the chemical industry warrants attention because accidents can have such devastating effects. Even though it happened more than 15 years ago in another country, most of us remember the Bhopal accident that killed several thousand people and injured tens of thousands of others. There never has been a chemical release of that size in the U.S, but the potential for harm is great. An estimated 85 million Americans — more than 30% of the U.S. population—live within 5 miles of one of the 66,000 sites that handle hazardous chemicals.

The figure on this page illustrates the kinds of systems that must be

CHEMICAL MANUFACTURING

Background and Vulnerabilities

The chemical industry is essential to the nation's quality of life, economic prosperity, and national security. The crude oil refining industry keeps American transportation running. Our health--and sometimes our lives--depend on pharmaceuticals produced by the chemical industries. And the manufacture of virtually every consumer product is in some way dependent on vital chemical ingredients.

On the economic side, the \$392 billion chemical industry is the largest in the manufacturing sector and employs more than 1 million

SYSTEMS THAT MAY BE AUTOMATED IN A CHEMICAL PLANT

Utility Systems

- Waste Treatment Systems
- Steam Plants
- Precipitators
- Scrubbers
- Incinerators
- Process Water Systems
- City Water Systems
- Compressed Air Systems
- Inert Gas Systems
- Fuel Gas Systems
- Electrical Switchgear
- Emergency Generators
- Fuel Oil Storage and Distribution Systems
- Gasoline and Propane Storage and Distribution Systems
- Refrigeration Systems

Environmental and Monitoring Systems

- Air monitoring Systems
- Effluent Monitoring Systems
- Groundwater Monitoring Systems
- Stack Gas Monitoring Systems
- Offline Testing Equipment
- Vibration Monitoring Equipment
- Leak Detection Equipment
- Vent Condensers
- Other Monitoring Systems

Safety and Security Systems

- Medical Equipment
- Building Entry Systems
- Gates and Badge Readers
- Perimeter Alarm Systems
- Security Cameras
- Emergency Response Equipment
- Spill Equipment
- Fire Detection & Alarm Systems
- Sprinkler Systems
- Fire Suppression Systems (Halon, etc.)
- Firewater Pump and Delivery Systems
- Fire Trucks
- Ambulances
- Outdoor Area Lighting
- Building Lighting
- Mobile Communications

Shipping and Handling Systems

- Truck Scales
- Loading/Unloading Equipment
- Drumming and Packaging Equipment
- Labeling Systems
- Barcode Printing and Scanning Systems
- Maritime Equipment

Laboratory & Analytical Systems

- LIMS
- Analyzers
- Laboratory Automation Systems
- Sampling and Sample Delivery Systems
- Application Testing System

Other Systems

- HVAC Systems
- Building Ventilation Systems
- Plant Data Networks PCs Used in Subsidiary Systems
- Vaults and Safes
- Locomotives
- Elevators
- Uninterruptable Power Supplies

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assessed and potentially remediated and tested for Y2K problems in the chemical-handling sector. Examples of systems that have failed during testing or in operations can be found at an EPA website²² and a U.K. "Faults Casebook" listing problems actually found with embedded systems in the office or factory use.²³

In addition to safe "on-site" operations, chemical-processing plants must prepare to deal with vulnerabilities in external services. For example, on November 24, 1998, a power outage caused the shutdown of an Anacortes, Washington refinery.²⁴ As the refinery was returning to operation after a cool-down period, an accident occurred that took the lives of six workers. The power outage may not have directly caused the accident, but it brought about the circumstances that put six men in danger, and ultimately cost them their lives.

Similar incidents have occurred recently at the Kaiser aluminum plant in Gramercy, Louisiana²⁵ and the Celanese plant in Mobile, Alabama.²⁶ The Celanese event killed one worker and injured four others, one critically. The Kaiser accident injured 24 and sent six to the hospital, cut the plant's operations in half and reduced the hourly workforce by half, caused a related facility in Jamaica to reduce mining operations and cut its workforce two-thirds, and forced a neighboring facility owned by LaRoche Industries to lay off 40 employees.

These examples highlight the startup and shutdown risks in chemical

plants, a situation analogous to airline accidents that are more likely during takeoffs and landings. This industry must be ready for any sudden Y2K-induced shutdowns.

One other recent incident highlights the chemical-handling industry's potential vulnerability to malfunctioning data systems. On June 10, 1999, a pipeline rupture in Bellingham, Washington killed 3 young men and spilled 277,000 gallons of gas. According to a DOT Office of Pipeline Safety official, *"Our concern is that perhaps the (computer) system wasn't used appropriately or maintained appropriately."*²⁷

This event spurred DOT to issue a Pipeline Safety Advisory Bulletin²⁸ on July 7, 1999 alerting *"pipeline owners and operators of potential operational limitations associated with supervisory control and data acquisition systems and the possibility of those problems leading to or aggravating pipeline releases."*

Finally, the concern about the chemical industry's Y2K vulnerability is far from a U.S.-only problem. The Organization for Economic Cooperation and Development's Working Group on Chemical Accidents stated in December 1998 that Y2K is *"a serious problem which must be addressed immediately."*²⁹ In fact, the case can be made that many parts of the world are more vulnerable to this problem than the U.S. due to the earlier start the U.S. made on Y2K.

What is Being Done?

Committee

The Committee took several actions in this area since its February 1999 report. First, the report to the Committee by the Chemical Safety and Hazards Investigation Board referred to in the earlier report was completed and delivered in March 1999. On March 15, 1999, a press conference³⁰ on the findings of the report was held. Besides the Committee Chair and the report's principal author, the industry was represented at the press conference by the Y2K coordinator of the Chemical Manufacturers Association. The press conference was attended by a fair cross section of the general and trade press and the event led to coverage in national and local papers and on CNN.

At the press conference, the Committee's chair declared he was significantly concerned by the report and that he would hold a committee hearing on this issue. This hearing was held on May 10, 1999³¹ in Trenton, New Jersey. The hearing had nine witnesses to represent the breadth of stakeholders in this sector: industry (large, medium and small), governmental oversight bodies, emergency response organizations, and workplace-safety and environmental advocates. The hearing addressed Y2K and chemical safety from two perspectives. The first hearing panel addressed the potential impact of the Y2K problem on chemical production, storage, or transportation. The second panel examined the issue from the per-

spective of emergency management and contingency planning.

The most recent action by the Committee was a letter³² from the Committee Chairman and Vice-chairman to the Chair of the President's Y2K Council asking him to convene a Chemical Industry Summit on this important topic. The concern expressed in the letter was generated by the lack of substantiated information on the overall readiness for Y2K of this vast and potentially very dangerous sector.

Finally, the Subcommittee on Clean Air, Wetlands, Private Property, and Nuclear Safety of the Senate Committee on Environment and Public Works also held a hearing on February 24, 1999 where the Chemical Safety and Hazard Investigation Board testified on the impact of Y2K on the chemical-handling industry.³³

The President's Y2K Council

The Council was slow to focus on the Y2K vulnerabilities in this sector. There is no mention of this topic in its first quarterly assessment³⁴ released in January 1999, although there are assessments in the second³⁵ and third³⁶ quarterlies. The major Council activity in this area was to convene a Chemical Industry Roundtable on August 30, 1999 in response to the Committee's letter requesting more attention on this area.

The Roundtable was attended by the chair of the Council and representatives from EPA, OSHA, and CSB, several chemical industry trade

associations, major chemical firms, unions, environmental organizations, and public interest groups. The call and preparation for the meeting itself have created a resurgence of interest in collecting assessment data in this sector. So far both CMA and SOCMA have announced they will update their surveys of member readiness in the near future.

The findings and action plan for this roundtable were not available at the time of this report. However, it is expected that more attention will be paid in ascertaining the readiness of firms that not members of the major trade associations who have so far accomplished the most in alerting enterprises in the chemical industry to this issue.

Chemical Safety and Hazards Investigation Board

The Chemical Safety and Hazards Investigation Board (CSB) has been tracking and addressing the Y2K issues in this area since the early part of 1998 if not earlier. The CSB lead board member for this issue has addressed numerous groups within the industry on the importance of this issue and the potential public safety and economic risks Y2K represents to the industry.

At the request of the Committee, the CSB conducted a full day workshop on this topic in December 1998. That event generated the most comprehensive analysis so far on this problem. The major findings of this study, available from the CSB website³⁷, are:

- Large enterprises with sufficient awareness, leadership, planning, financial and human resources are unlikely to experience catastrophic failures and business continuity problems unless their current progress is interrupted or there are massive failures of utilities.
- The overall situation with small and mid-sized enterprises is indeterminate, but efforts on the Y2K problem appears to be less than appropriate based upon inputs from many experts.
- While the impact of the Risk Management Plans should be positive, there are no special emphases or even specific mention of Y2K technology hazards in either EPA or OSHA regulations regarding process safety.
- Federal agencies are aware of and involved in Y2K technology and chemical safety issues. However, significant gaps exist, and there do not appear to be specific plans to address these gaps.

Another specific action the CSB has taken was to send a letter³⁸ to all 50 state governors and chief executives of the Northern Mariana Islands, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands. This July 22, 1999 letter urged them to review and act on Chemical Safety Board (CSB) recommendations designed to avert or minimize the effects of Year 2000 technology problems which may affect industrial chemical safety.

Environmental Protection Agency

EPA is the lead agency on the Federal level for ensuring that the public and the environment are protected from excessive or dangerous releases of toxic or hazardous chemicals. A good summary of EPA's responsibilities and legislative authorities to act was presented in testimony before the Committee on May 10, 1999.³⁹ Based on its charter and long-standing relationship to the chemical sector, EPA was tasked by the President's Y2K Council to lead the outreach to the Chemical Sector.

Specific actions EPA has taken include:

- Provided EPA speakers for many industry Y2K meetings
- Developed and distributed a Y2K "tool kit" for the chemical sector
- Worked with chemical industry trade associations to raise awareness, collect assessment data, and conduct contingency planning workshops
- Directly contacted Toxic Release Inventory and pesticide registrants through the Office of Prevention, Pesticides, and Toxic Substances to remind them of their obligation to ensure the integrity of the data reported to EPA.⁴⁰
- Developed and distributed a Year 2000 Chemical Safety Alert for the chemical sector through the Chemical Emergency Preparedness and Prevention Office. Within this alert is the explicit reminder to the industry that under the Clean Air Act, "owners and operators of facilities with haz-

*ardous substances have a general duty to prevent and mitigate accidental releases, including those cause by Y2K failures."*⁴¹

This alert goes further to add, "under EPA's Risk Management Program (RMP) Rules ... accidental releases related to Y2K problems (e.g., loss of utilities, interruption of raw material deliveries, failure of monitoring devices) would be reasonable alternative scenarios to consider."

- Issued a Y2K enforcement policy on November 30, 1998 to encourage testing of computers and systems that potentially could impact environmental regulatory compliance.⁴² Under this policy, EPA has stated that it will waive 100% of the civil penalties and recommend against criminal prosecution for environmental violations that occur during testing conducted specifically for Y2K preparations.
- Supported the outreach and education programs of others such as the Internet based compliance assistance center, ChemAlliance⁴³, which provides Y2K preparation guidance to the chemical industry.
- Issuing an alert "*encouraging regulated entities to take prompt and proper measures to prevent potential Year 2000 (Y2K) computer failures that may cause releases detrimental human health and the environment.*"⁴⁴

Occupational Safety and Health Administration

OSHA testified before the Committee on May 10, 1999. According to the testimony, *"OSHA's core mission is to provide a safe and healthful workplace for every working man and woman in the nation."* OSHA's data indicates that despite a common impression, the chemical production sector has a substantially lower injury/illness rate than the national average. The outcome of this analysis is that the chemical industry has not been a target for OSHA programmed inspections. In Fiscal 1998, Federal OSHA conducted about 950 inspections in the chemical sector out of 32,000 total inspections.

OSHA does enforce many standards that apply to the chemical sector. Two of the most important are the Hazard Communication Standard, which requires employers to alert workers to hazardous chemicals they may be exposed to and the Standard on Process Safety Management of Highly Hazardous Chemicals, (PSM). Under PSM, employers who possess a threshold quantity or greater of substances on OSHA's list of highly hazardous chemicals are required to assess the risk posed to workers and to develop a plan to mitigate those risks. Employers must include equipment and controls in their plans, and thus, *"employers have a responsibility to assure the effects of the Y2K problem on any such equipment or controls are appropriately managed."*⁴⁵

However, OSHA's position is that it cannot assure chemical industry Y2K readiness through inspections under the PSM program for two major rea-

sons: (1) many chemical facilities potentially facing Y2K compliance issues are not covered by the PSM rule and (2) OSHA does not have the resources to execute the lengthy and numerous inspections required. OSHA has also stated that its General Duty clause *"would be a cumbersome tool with which to address Y2K-related equipment failures."*⁴⁶ Finally, OSHA rejects the idea that chemical companies should submit Y2K-readiness certifications to OSHA on several grounds, including the lengthy time to initiate such a process absent a congressional mandate and because it would be impractical with OSHA's existing resources.

Given the reasoning above, *"OSHA has concluded that the existing regulatory framework will not effectively deal with the Y2K problem in the chemical industry."*⁴⁷ OSHA has opted instead for an outreach and education based program. Specific actions OSHA is taking include:

- Producing an OSHA fact sheet, "How the Millennium Bug Can Affect Workplace Safety and Health"⁴⁸
- Alerting OSHA Area Directors, Regional Administrators, and Consultation Project Managers of websites with educational materials on Y2K
- Including the Y2K fact sheet in a mailing to the 12,500 employers with the highest injury rates in April 1999
- Requiring that OSHA compliance officers distribute Y2K fact sheets during each of their approxi-

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mately 32,000 inspections in 1999

- Making the OSHA fact sheet available to an additional 60,000 state OSHA inspectors
- Providing Y2K information during OSHA consultation visits during 1999
- Distributing Y2K information through the Voluntary Protection Programs Participant's Association.

Trade Associations

The chemical industry has a number of trade associations active in raising members' Y2K awareness, conducting Y2K readiness surveys, and supporting contingency planning efforts. The CMA was perhaps first onto the issue. CMA represents the largest chemical producers and has approximately 190 members. CMA's first survey was released in March 1999 and represented about 70% of the membership. In general, reported progress was good. Highlights of the survey include:

- All respondents have [written] Y2K action plans.
- 98% of respondents have addressed the readiness of key suppliers, customers and supply chain organizations.
- 97% have addressed safety, environmental and health systems.
- 90% expect to be ready by September 30, 1999 and 100% expect to be Y2K ready by December 31, 1999.
- Testing of mission-critical systems is a plan element for 98% of the respondents.
- 92% of respondents have contingency planning elements for all business systems.

One must keep in mind that these numbers correspond to the approximately 70% who responded and the data may not be accurate for the 30% who did not, and that this is all self-reported data. CMA has announced plans to update this survey and will keep it as a running survey as more data becomes available.

Two other products from the trade associations are the CMA "Consensus Document on Y2K Contingency Planning" and the more detailed "Y2K Contingency Planning Guidelines, March 1999" from the Chemical Information Technology Association. Both can be found on the CMA website⁴⁹ under the "News and Information" section.

Following on the CSB report that emphasized the lack of readiness information about the Small and Medium Enterprises (SME) in the chemical sector, a joint survey was conducted by seven trade associations of these firms, aided by the CMA, CSB and EPA. The results of this survey⁵⁰ became available in May 1999, and were reassuring on the surface. Highlights from the survey include:

- 99% of respondents report business IT systems will be Y2K ready by September 30, 1999.
- All respondents report that manufacturing, inventory and

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distribution IT systems will be Y2K ready by September 30, 1999.

- 99% indicate that embedded systems will be Y2K ready by September 30, 1999.
- 93% report that supply chain relationships will be Y2K ready by September 30, 1999.
- All respondents state that they will be ready in all areas of concern by December 31, 1999.
- Based on direct conversations with member companies, many report not having issues with embedded systems because their processes are not automated.

However, the Committee did not feel that it was justifiable to extend these survey results to all small and medium chemical firms for the following reason. The survey had less than a 5% response and was not a statistically valid sampling of the entire universe of small and medium sized chemical firms. This was a prevailing reason in the Committee's request to the President's Y2K Council to conduct a Chemical Industry Summit on this topic.

Finally, as reported in the President's Conversion Council's third quarterly assessment, *"To assist SMEs who are not members of trade associations, EPA, the Chemical Safety and Hazard Investigation Board and trade associations representing small to medium-sized chemical companies are jointly preparing a special guidance document entitled: 'Addressing Year 2000 Issues in Small and Medium-Sized Chemical Facilities.' The document, which will*

be published in the third quarter 1999, is a part of an on-going effort to assess and address potential Y2K disruptions in facility operations, with a particular emphasis on safety-related control systems and equipment. EPA will distribute the guidance to its Toxics Release Inventory respondents (approximately 30,000 chemical facilities) and to its Federal Insecticide, Fungicide and Rodenticide Act registrants. The trade associations will make the guidance available through mailings, on their web sites and at various industry conferences throughout the year." This document is now available from many sources on the web and elsewhere, including EPA's Year 2000 website.⁵¹

Activities by Other Entities

California Office of Emergency Services Y2K Hazardous Materials Project: As a result of Governor Gray Davis' Executive Order D-3-99, the Governor's Office of Emergency Services (OES) initiated the Y2K Hazardous Materials Project⁵² to protect the health and safety of the people of California and its environment by assisting in the Y2K readiness of approximately 130,000 hazardous materials facilities/handlers in California. The objectives of this project include:

- Communicate with hazardous materials facilities/handlers regarding the potential impact of Y2K;
- Work with the technical experts to identify those facilities/handlers most vulnerable to Y2K failures

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which could impact health, safety and the environment;

- Coordinate the Y2K efforts of technical experts in fields such as water quality, air quality, radiological and chemical process safety, toxicology, industrial hygiene, pesticide and medical waste;
- Emphasize compliance with existing laws and regulations;
- Conduct onsite visits to the most vulnerable facilities/handlers, and encourage them to remediate technical problems, create work-around procedures and update contingency plans; and
- Develop contingencies to avoid possible hazardous material incidents.

Small and Medium Sized Enterprises Study: The Mary Kay O'Connor Process Safety Center has initiated a study on "Y2K Readiness of Small and Medium-sized Enterprises (SMEs) involved in chemical, petrochemical, refining, and offshore petroleum activities." ⁵³ The project is supported by a grant from the Nathan-Cummings Foundation. Included in the study is a:

1. A scientific survey of the awareness and engagement of SMEs regarding the Y2K problem,
2. Development of a few credible Y2K induced scenarios, including the potential for catastrophic events as well as economic disruptions, and
3. A report based on the research and conclusions derived from the study, including recommenda-

tions of critical steps that industry, federal agencies, state and local authorities, and congress can take to prevent Y2K disasters related to SMEs.

A telephone survey was designed, with input from survey professionals as well as knowledgeable Y2K experts. Approximately 200 small firms were targeted in each of the states of New Jersey, California, Kansas, and Texas. As of the end of August, the number of completed surveys are as follows: NJ: 31; CA: 46; KS: 62; TX: 57. Efforts to date are concentrated on increasing the number of completed surveys to approximately 100 for each of the aforementioned states. Survey results and a summary report will be made available in October 1999.

EDF Checklist: The Environmental Defense Fund recently released two checklists⁵⁴ to help communities identify industrial facilities using hazardous chemicals that could pose serious hazards due to Y2K-related computer problems. One checklist provides plant process and financial characteristics that can help identify facilities not now Y2K-compliant, and the other lists characteristics that can worsen the public impacts of a hazardous chemical or petroleum release. Plant neighbors can use these checklists to identify facilities that need to act now to prevent Y2K-related problems.

NIEHS Worker Training Course: A special training course to help workers prepare for potential health and safety risks associated with Y2K is being developed by the National Institute of Environmental Health

Sciences (NIEHS) and the National Clearinghouse for Worker Safety & Health Training.⁵⁵

The course will target workers in a variety of sectors including the industrial trades, the construction trades, the health care industry, hazardous materials related fields, and emergency response activities. It will include an overview of who and what the Y2K problem could potentially impact, an update of the state of individual industries' Y2K compliance, an outline of how the problem might affect different workplaces, as well as measures workers can take to safeguard themselves and others.

Local Emergency Planning Committee Y2K Compliance Requirement: The City of Ann Arbor Michigan and Washtenaw County Local Emergency Planning Committees issued a letter on April 15, 1999 *"requiring all facilities in the County that use, produce or store more than 55 gallons of chemicals to send a letter indicating that Y2K computer and process safety management issues have been addressed and that your facility is in compliance. The LEPCs will be publishing lists of facilities that have submitted compliance letters."*⁵⁶ At the time of this report, the LEPCs had received 231 responses to over 800 letters mailed. 164 responses said they have no computers, while 65 report they are compliant or will be before January 1. Two of the responses were noncommittal. The LEPCs are striving to increase the response rate.

Concerns and Expectations

In a sector with so many small, medium and large entities that also has such a variety of processes and potential vulnerabilities as the chemical sector, it is impossible to make precise predictions what the Y2K impact will be, especially given the scarcity of verifiable and independent assessment data. From the Committee's research, it appears that the largest companies that would cause the greatest public health threat or environmental disaster in a Y2K-related incident are working the problem hard and will be ready come December 31. In addition, the medium- and small-sized producers are most often batch processors⁵⁷ who would generally not be processing at midnight on New Year's Eve anyway and this December 31 should be no exception. Despite this general impression of progress, the Committee feels that it is still essential to continue to maintain vigilance in this area because of the risk associated with problems in this area.

During the course of the Committee's investigations, several activities were identified that will assist in maintaining surveillance and managing the century transition successfully:

Surveys still underway: Because of the continual attention on this issue, several trade associations have decided to update their surveys. At the time of this report, SOCMA and CMA are collecting new data and plan to have releasable information soon. Other entities such as the LEPCs in Ann Arbor, Michigan and Washt-

enaw County, Michigan are publishing lists of compliance letters received in response to their request.

A very useful snapshot of the Y2K preparations being made by small- and medium-sized firms should arise from the Mary K. O'Connor Process Safety Center's study. While focusing on only four states, albeit important states to the chemical industry, this is the only activity the Committee is aware of that will either challenge or support the depiction of the industry that emerges from the self reported surveys.

Managing the Rollover: During the course of investigating this issue, the Committee was pleased to learn that many major firms in this industry were planning to implement "Early Warning" or "Follow the Sun" alerting systems analogous to the "First Alert" early warning system the Committee called for in October 1998.⁵⁸ These systems will monitor and report events at chemical plants spread around the globe to a central location as the New Year occurs in successive time zone on December 31, 1999. Chemical plants in later time zones may be able to capitalize on this advance notice to minimize potential incidents.

The EPA plans several actions to be able to respond to incidents involving chemicals. First, the agency's Emergency Operations Center will be up and running during the century change. There will be separate desks operating for the chemical, water and emergency response sectors. Next, EPA will have personnel in FEMA's Emergency Re-

sponse Center to support actions required under the Federal Response Plan. EPA is the lead agency for Emergency Support Function #10, Hazardous Materials, under that plan. Finally, EPA will have personnel located at the ICC to handle chemical, water, and emergency response issues.

To alert oil companies and oil spill response organizations around the world to incidents that occur as a result of the "Millennium Bug", and to record the level of response, Oil Spill Response, Ltd. is establishing a Communications Center at its operational base in Southampton, England.

OSRL's Communications Center will collect data on incidents from participating companies and response centers. A Global Status Report will be regularly prepared and distributed via an agreed Communications Network to all those who are participating, and is also available to interested parties via the Internet on OSRL's website.⁵⁹

Chemical Plant Stand-downs: Several large chemical firms have announced plans to shut down at least some of their plants before midnight December 31 and restart in gradually after January 1. In addition, some small and medium sized firms have decided as a public reassurance effort to increase staff over normal levels on December 31 to increase visibility and deal with potential disruptions.

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³ United States Small Business Administration Office of Advocacy, RS Number 183, April 1998, U.S. Summary Corporate Change Tables.

⁴ <http://y2khelp.nist.gov/tool.nsf/frmEF?ReadForm>

⁵ William J. Dennis, Jr., Small Business and the Y2K Problem: Part III, NFIB Education Foundation, June 7, 1999.

⁶ Ibid.

⁷ Reuters, "Many small businesses in Europe not ready for Y2K," Special to CNET News.com, September 6, 1999.

⁸ General Accounting Office Report to the Committee on Small Business, U.S. Senate, "Year 2000 Computing Challenge: SBA Needs to Strengthen Systems Testing to Ensure Readiness," August 1999, GAO/AIMD-99-265.

⁹ NAM Press Release #99-239 dtd July 15, 1999; "New NAM-Yardeni Poll Shows Major Manufacturers Optimistic about Overcoming 'MILLENNIUM BUG'," News Contacts: Rob Schwarzwald (202) 637-3090, Jan Amundson (202) 637-3055.

¹⁰ CapGemini Press Release dtd August 10, 1999, "Fewer than Half of Major Firms Anticipate Full Year 2000 Compliance in Critical Systems by Year's End," Press Contacts: Steve Vitoff (212) 481-7000 x137, Mark Schroeder (212) 481-7000 x145.

¹¹ Merrill Lynch Special Report, "Y2K: Bulls, Bears or Bugs?," July 1999.

¹² Testimony of Gary Beach, Publisher of CIO Magazine, before the US Senate Special Committee on the Year 2000 Problem, Washington D.C., July 22, 1999.

¹³ CapGemini Press Release dtd August 10, 1999, "Fewer than Half of Major Firms Anticipate Full Year 2000 Compliance in Critical Systems by Year's End," Press Contacts: Steve Vitoff (212) 481-7000 x137, Mark Schroeder (212) 481-7000 x145.

¹⁴ Merrill Lynch Special Report, "Y2K: Bulls, Bears or Bugs?," July 1999.

¹⁵ Testimony of Joseph C. Pucciarelli, Vice President and Research Director, Business Management of Information Technology Research Center, GartnerGroup, Inc., before the U.S. House of Representatives Science Committee's Subcommittee on Technology and the Committee on Government Reform's Subcommittee on Government Management Information and Technology, Washington, D.C., August 4, 1999.

¹⁶ Prepared statement of Jacquelyn L. William-Bridgers, Inspector General of the US Department of State, Arms Control and Disarmament Agency, and US Information Agency, including the Broadcasting Board of Governors, before the Special Committee on the Year 2000 Technology Problem, July 22, 1999.

¹⁷ The contractor performing the work for the USDA is the GartnerGroup. Gartner has performed to reports in response to the contract. The most recent was dated July 2, 1999.

¹⁸ GMA/FMI Y2K Business Contingency Planning Framework.

¹⁹ GartnerConsulting, "Assessment of the Year 2000 Remediation Status within the Nation's Food Supply," Prepared on Behalf of U.S. Department of Agriculture, dtd July 2, 1999.

²⁰ Ibid.

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²¹ Caron, James, Shipper and Exporter Assistance, Transportation and Marketing, Agricultural Marketing Service, USDA, and Gressel, Field Communications Office, Foreign Agriculture Service, USDA, "Y2K and International Agriculture Transportation: Analysis of Export Markets, Import Suppliers, and Major Food Aid Recipient Countries," prepared for USDA's Food Supply Working Group, September 1999.

²² <http://www.epa.gov/region02/y2k/y2kcase.htm>

²³ <http://business.bug2000.co.uk/databases/index.shtml>

²⁴ <http://www.csb.gov/1999/i9908.htm>

²⁵ Associated Press, PM-AL -- Chemical Plant Reaction, 0350, 07:29:34, 31 August 1999.

²⁶ Associated Press, BC-LA -- Kaiser Explosion, 0290, 02:27:40, 07 September 1999.

²⁷ Associated Press, PM-WA -- Pipeline Explosion, Bjt, 750, 02:28:11, 12 August 1999.

²⁸ <http://www.chemsafety.gov/y2k/brochure9907.htm>

²⁹ http://www.oecd.org/news_and_events/release/nw98-113a.htm

³⁰ <http://y2k.senate.gov/news/pr990315.htm>

³¹ <http://y2k.senate.gov/hearings/990510/>

³² <http://y2k.senate.gov/news/pr990809.htm>

³³ http://www.senate.gov/~epw/stm1_106.htm#02-24a99

³⁴ <http://www.y2k.gov/new/FINAL2.htm>

³⁵ <http://www.y2k.gov/new/FINAL3.htm>

³⁶ <http://www.y2k.gov/new/3rdquarterly.html>

³⁷ <http://www.chemsafety.gov>

³⁸ <http://www.chemsafety.gov/1999/news/n9932.htm>

³⁹ <http://y2k.senate.gov/hearings/990510/jmakris.htm>

⁴⁰ Ibid.

⁴¹ "Prevent Year 2000 Chemical Emergencies," US Environmental Protection Agency, Office of Solid Waste and Emergency Response (5104), EPA 550-F-99-003, February 1999, p. 4.

⁴² <http://www.epa.gov/year2000>

⁴³ <http://www.chemalliance.org>

⁴⁴ "Enforcement Alert," Vol.2, No. 5, Office of Regulatory Enforcement, EPA 300-N-99-010, August 1999.

⁴⁵ <http://y2k.senate.gov/hearings/990510/ffrodyma.htm>

⁴⁶ Ibid.

⁴⁷ Ibid.

⁴⁸ <http://www.osha.gov/Y2knews.pdf>

⁴⁹ <http://www.cmahq.com>

⁵⁰ <http://y2k.senate.gov/hearings/990510/soc.htm>

⁵¹ <http://www.epa.gov/year2000/smefinal.pdf>

⁵² <http://www.oes.ca.gov/>

⁵³ <http://process-safety.tamu.edu/>

⁵⁴ http://www.edf.org/pubs/newsreleases/1999/aug/h_Y2KcheckAC2.html

⁵⁵ <http://204.177.120.20/wetp/clear/y2k/index.htm>

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⁵⁷ For a discussion of 'batch' processing, see the: <http://y2k.senate.gov/hearings/990510/jschleck.htm>

⁵⁸ <http://y2k.senate.gov/news/pr981002.htm>

⁵⁹ <http://www.oilspillresponse.com/>